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ABSTRACT

Each day, percentage scores on classroom and homework papers determined assignment of fifth and sixth grade students (N=53) into three groups. Children who were above 90 percent or had 10 percent improvement were given access to all activities in a project room. Children with less than 10 percent improvement were given limited access to activities. Children who decreased more than 10 percent were restricted to teaching machines. When spelling scores were no longer included in percentage scores, spelling scores decreased. When spelling was again counted but math was not, spelling scores increased and math scores decreased. The success of the manipulations indicated that written performance in the classroom, including tests and homework, can be brought under operant control. Reinforcement in this case was the opportunity for the child to work on such projects as baking and working on models. Children seemed to respond much better to reward than to whatever consequences presumably followed their poor scores in the classroom or at home. (Author/JS)

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Improved Classroom Performance by Reinforcement Outside the Classroom

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Techniques of behavioral control in the classroom have come a long way since the statement in the 1939 British Journal of Educational Psychology that "... with younger children the sharp corrective and stimulating effects of an occasional stroke with the cane is of greater benefit than the most sympathetic explanations..." (Hopkins, 1939, p. 26). The reinforcement principle has been used successfully to control the behavior of nursery school children, by making the opportunity to engage in high probability behavior (running around the room, screaming, etc.) contingent upon the emission of non-disruptive, low probability behaviors (sitting quietly, listening). Also, tokens earned for non-disruptive behavior have been used to buy time for disruptive behavior (Homme, Debaca, Devine, Steinhorst and Rickert, 1963). Similarly, McIntire, Jensen, and Davis (1968) have used a token economy system to control disruptive behavior.

The behavior analysis of classroom academic performance has received growing attention. In addition to extended use of tokens (O'Leary, et al.), teacher attention (Madsen, et al., Hall, et al., 1968) has been used as a controlled reinforcer in this setting. In each of these cases some changes in regular classroom procedures are required in order to make

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the reinforcer immediate and in order to make sure that small increments in performance are reinforced.

The present study delays reinforcement for performance of classroom academic skills until another time and place, but emphasizes reinforcement of improvements in performance even from very low levels. Access to the reinforcer is external to the classroom, yet its effectiveness is demonstrated through reversal procedures.

Advantages of the procedure may be: 1) Interference with and necessary cooperation with on-going classroom activity is minimal, 2) Reinforcers are directly contingent on academic performance and do not rely on an indirect measure such as time on task, 3) Reinforcement of the very first increments in performance is allowed regardless of the low level at which this increment may occur.

Method

Subjects.

The subjects were all the students in one fifth and one sixth grade class. There were 27 in the sixth grade and 26 in the fifth grade (Total N = 53).

Procedure.

Each class was divided into four groups. For a half-hour twice a week, each group left its regular classroom and came to a special Project Room. In this room were materials for baking and cooking, making ceramic ashtrays; models, educational games, and teaching machines. For one week, beginning on March 21st, the children brought all written work to the room.

The points earned were tallied, and the proportion of points correct over total points possible was computed and written on a blackboard next to the child's name. All children then worked on ceramic ashtrays and were shown around the room.

After the first week, the procedure was explained to the children. The activities in the room were divided into three levels: red, yellow, and white. The red level included all activities in the room. To get in the red level, the child had to get either a 90% or better (points correct over total possible points) or go up ten percentage points from his score of the last session. The yellow level included games, working on ceramic candy dishes, or working on teaching machines. To be in the yellow level, the child had to remain within ten percentage points, in either direction, of his score from the last session. (If he had earned a 90% or above and stayed in that range, of course, he would be in the red level.) The white level included only working on teaching machines. To be in the white level, the child had to go down more than ten percentage points from his last score.

At each session the child brought in all the written work he had done since the last session. The teacher sent in a master list of all assignments and total possible points. If the child had not done an assignment and had not been excused, he was given a zero for that assignment. The proportions were computed as the child handed in his papers and were listed on the board. He was given either a red, yellow, or white tag to wear and then went to his activity.

At the beginning of Phase II, the fifth grade was told that spelling papers would no longer count in the calculation of their percentage scores for the Project Room. The sixth grade was told that math papers would no longer count.

At the beginning of Phase III, the fifth grade was told that math papers would not count but that spelling papers would. The sixth grade contingency was also reversed--they were told that spelling papers no longer counted but that math papers did. This condition continued until the end of the experiment.

Results

The manipulations of spelling and math score contingencies were successful for the fifth grade (see Fig. 1). For spelling scores, there was a significant difference between baseline and Phase II, during which spelling scores were not counted in the calculation of percentage scores (Mann-Whitney $U = 8$, $p < .001$). Spelling scores significantly increased during Phase III, when spelling again counted but math did not count ($U = 6$, $p < .001$). No significant difference appeared between baseline and Phase III scores ($U = 65$, $p > .05$), indicating that spelling scores increased to, but did not differ from, baseline level when they were again counted. For math scores, there was no significant difference between baseline and Phase II, when spelling did not count but math scores did ($U = 63$, $p > .05$). Math scores were not counted during Phase III, and there were significant differences between math scores in Phases II and III ($U = 4$, $p < .001$), and between baseline and phase III ($U = 4$, $p < .001$).

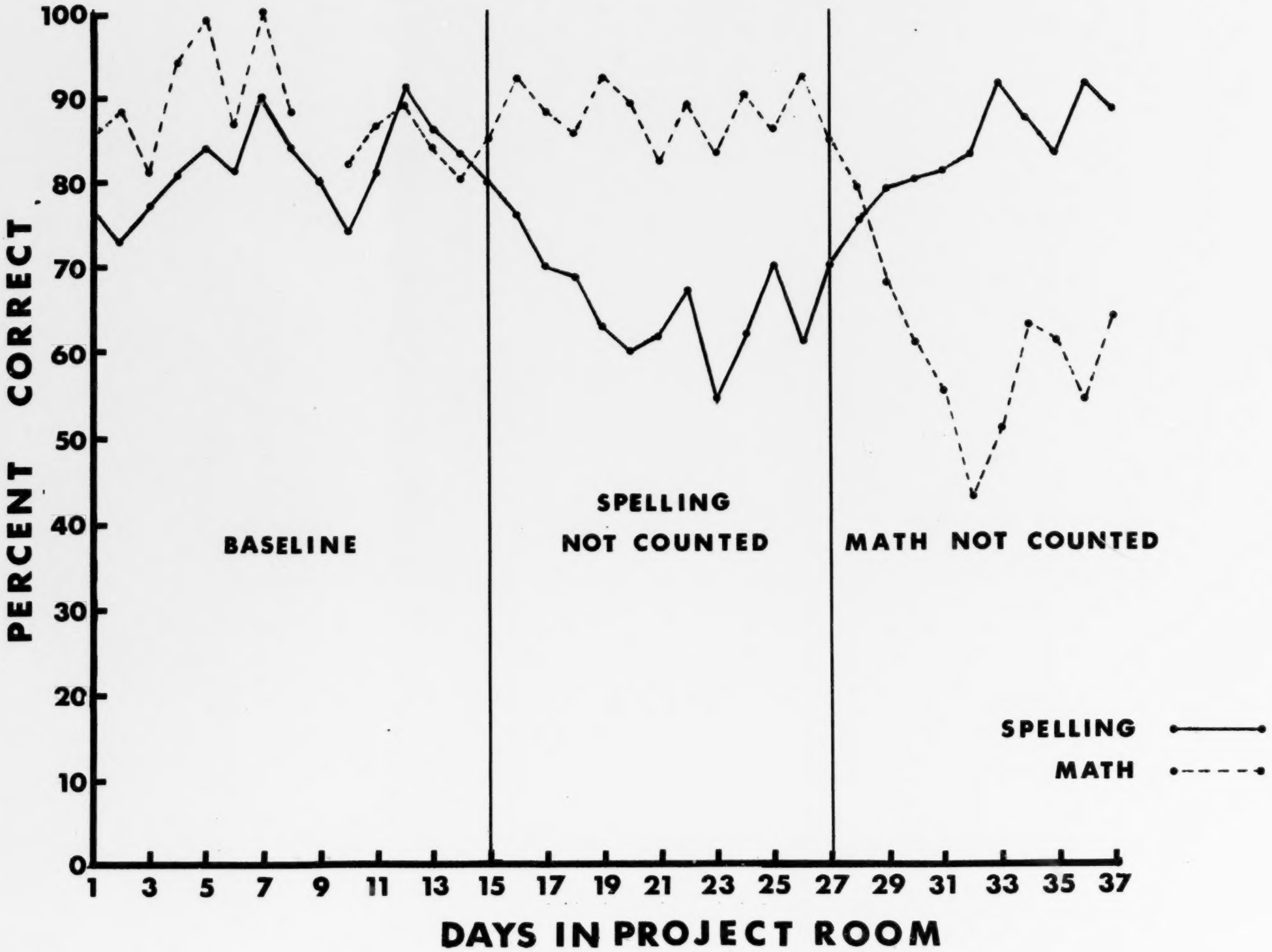
Figure 2 shows selected individual performances.

For the total sixth grade, the manipulations were ineffective for spelling scores, but were effective ($p < .05$) for math scores (see Fig. 3), although this effectiveness was not nearly as striking as it had been for the fifth grade (see Fig. 1).

Conclusions

The success of the manipulations for the fifth grade indicates that written performance in the classroom, including tests and homework, can be brought under operant control. Reinforcement in this case was the opportunity for the child, via a high percentage score or improvement in score, to work on any activity in the Project Room. Baking and working on models were restricted to the highest (red) level, for which the child had to attain a score of 90% or better, or go up 10 percentage points from his last score. These activities were nearly always chosen by children who had qualified for them. When math or spelling scores were no longer relevant to the attainment of these reinforcers, performance levels dropped. When math or spelling scores were again relevant, performance in these areas rose.

It should be noted that many of the assignments for both math and spelling were in the form of homework, rather than in-class tests. When such homework was no longer counted in the Project Room, their scores fell dramatically. These children seemed to respond much better to reward than to whatever consequences presumably followed their poor scores in the classroom or at home, since the scores did not rise until reward was reinstituted.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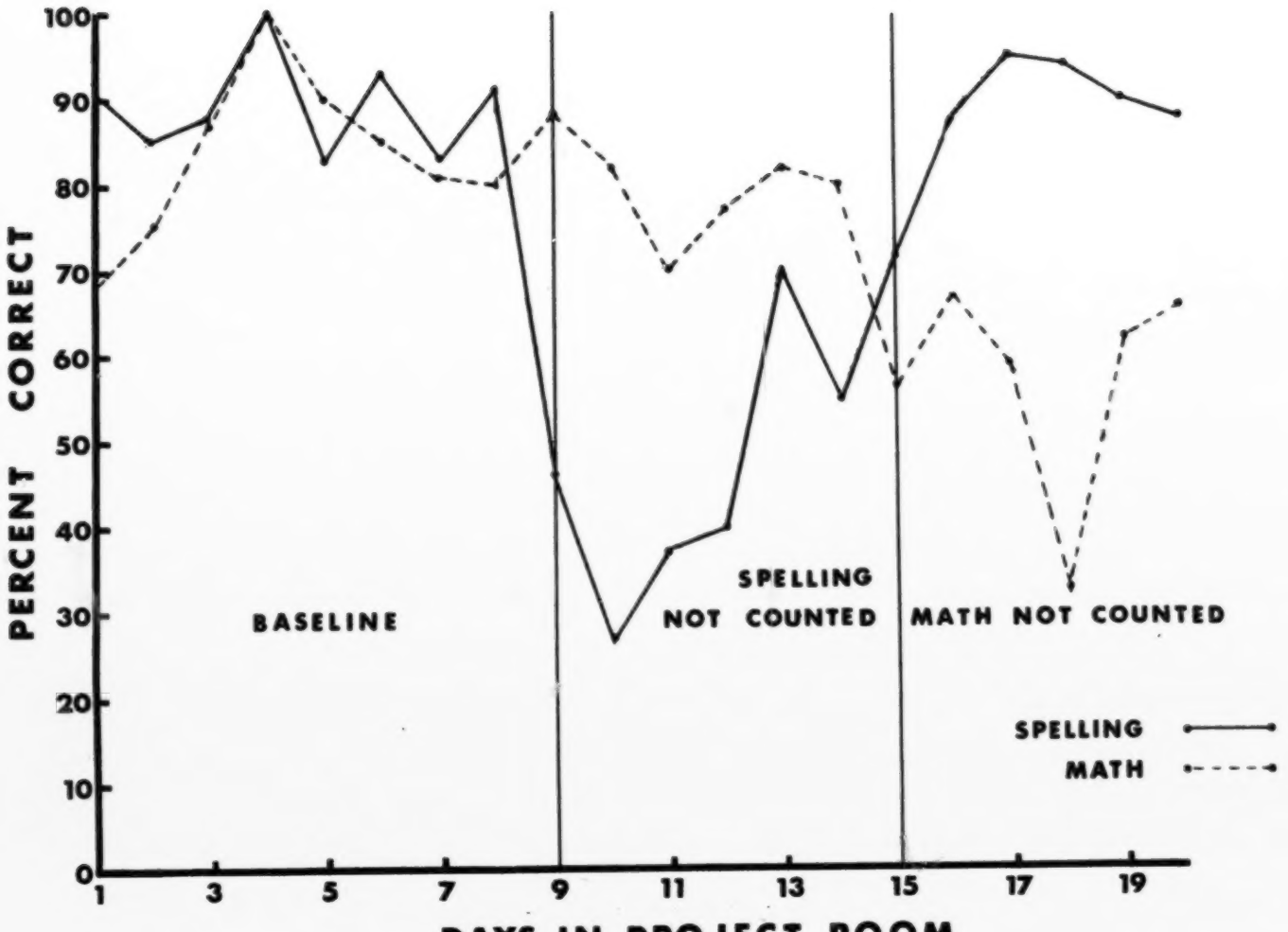
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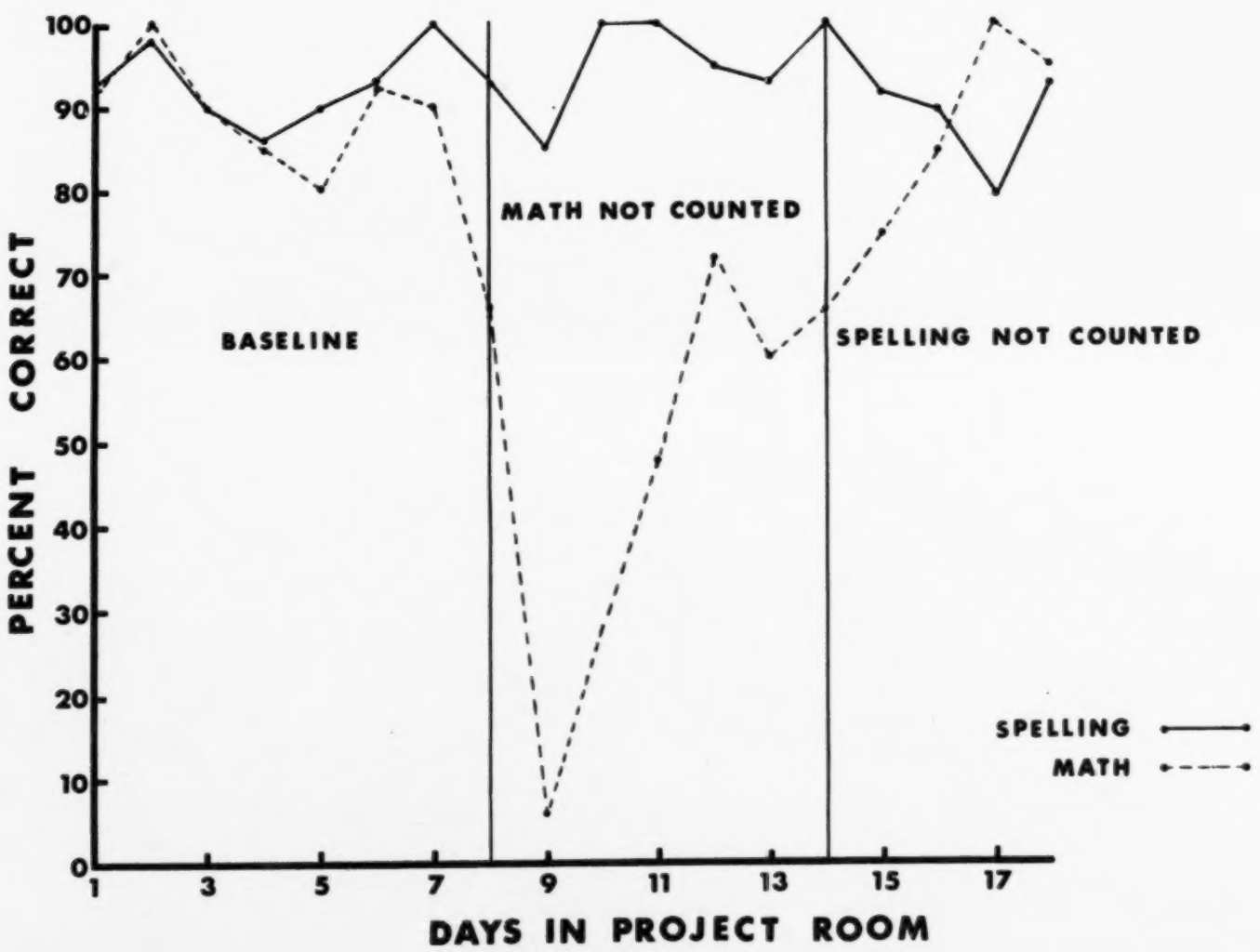
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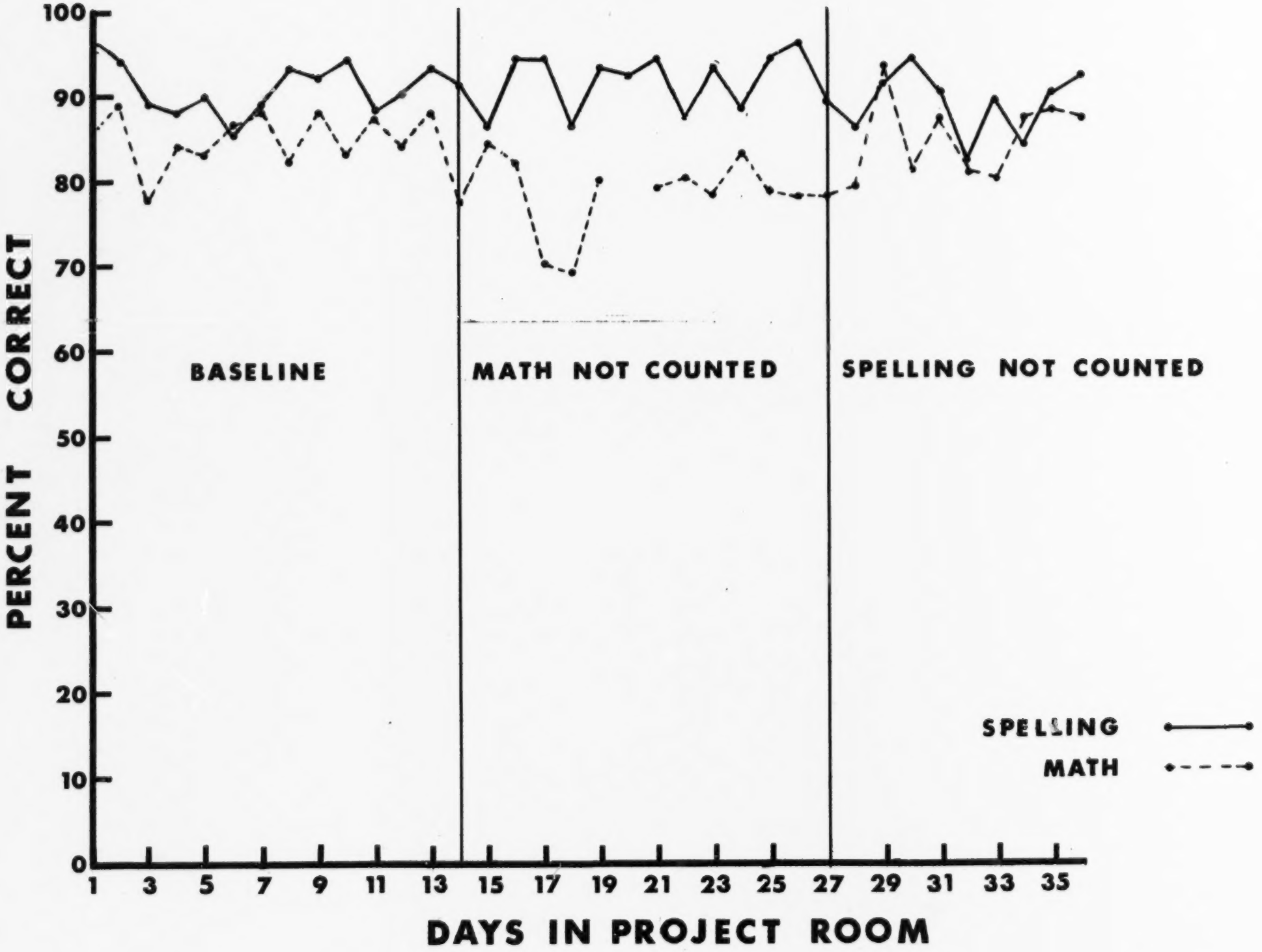
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Figure Captions

Fig. 1. Performance of the fifth-grade class.

Fig. 2. Performance of individuals from the fifth grade (upper graph) and sixth grade (lower graph).

Fig. 3. Performance of the sixth-grade class.